THE IMPACT OF PEER VICTIMIZATION ON PHYSICAL ACTIVITY IN OVERWEIGHT YOUTH: EXPLORING RACE AND ETHNIC DIFFERENCES

A Dissertation

by

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ABSTRACT

A significant portion of America's youth is overweight or obese. Bully victimization and psychological maladjustment disproportionally afflict this population; however, it is unknown how these factors are related to each other. Furthermore, being overweight or obese is more prevalent among African American youth who are subsequently at risk for physical and mental health problems associated with excessive body fat. Guided by the Transactional Stress and Coping model, the current study explored whether family and peer supports could buffer against the negative effects of bullying in order to promote physical activity in overweight and obese youth. Findings highlighted the role parents might play in the impact of bullying, maladjustment, and physical activity. Though results for White and African American youth were largely similar, some differences emerged. Implications for theory and future research was discussed.

DEDICATION

This work is dedicated to my family, Stella, Arnold, and Arlynn, to whom I owe the world and then some.

"That's how you devour a whale, Doug. One bite at a time."

-Francis J. Underwood

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CHAPTER I

INTRODUCTION

Globally, pediatric overweight and obesity is one of the greatest public health challenges in modern times (Janssen et al., 2005). About a third of the youth in the United States are overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Racial and ethnic minorities and youth from low socioeconomic status (SES) families are at an increased risk for being overweight and obese (Ogden, Lamb, Carroll & Flegal, 2010). Pediatric obesity is long-term, is difficult to treat, and is associated with numerous physical health as well as mental health complications in youth. Since a majority of overweight and obese youths become overweight and obese adults, they also suffer the negative consequences of adult obesity (Guo, Wu, Chumlea, & Roche, 2002).

Although there are many determinants of pediatric obesity (see Lindsay, Sussner, Kim, & Gortmaker, 2006), low physical activity levels is one major factor in excessive weight gain in youth. Across over 30 countries, the likelihood of school-aged youth being overweight has been shown to decline as physical activity increases (Janssen et al., 2005). Unfortunately, significant portions of American youth fail to meet national recommendations for youth physical activity: 60 minutes or more of daily physical activity (Center for Disease Control (CDC), 2011). Furthermore, the number of youth failing to meet this requirement increases with age (Borraccino et al., 2009; Nader, Bradley, Houts, McRitchie, & O'Brien, 2008; Trojano et al., 2008). Trojano and colleagues found 42% of youth ages 6 to 11 met recommendations on most days of the week; however, only 8% of youth ages 12 to 15 and 7.6% ages 16 to 19 achieved

recommended levels of physical activity. Therefore, identifying factors that increase and decrease physical activity is critical to promote health.

Bully victimization is emerging as one potential factor that influences physical activity in overweight and obese youth (Gray, Janicke, Ingerski, & Silverstein, 2008; Storch et al., 2007; Faith, Leone, & Ayers, 2002; Hayden-Wade et al., 2005). Faith and colleagues (2002) found weight criticism during physical activity was associated with reduced sports enjoyment, reduced physical activity, and reduced intensity in leisure activity. Psychological maladjustment (e.g., depressive symptoms) may also play a role in this relationship. In a cross-sectional study of 92 overweight and obese youth ages 8 to 18 years, loneliness was found to mediate the relationship between bullying and physical activity. Depression was also found to partially mediate this relationship (Storch et al., 2007). Therefore, bully victimization may reduce physical activity only to the extent victimization significantly impacts maladjustment.

Finally, a remarkable race and ethnic disparity exists in obesity prevalence and youth physical activity levels (Ogden et al., 2010; Kimm et al., 2008; Trojano et al., 2008). Since children and adults who are overweight or obese are at-risk for experiencing negative outcomes, it is plausible various race and ethnic groups are disproportionally at-risk for suffering the physical and mental health consequences of obesity. Combined with the findings that weight loss intervention is less effective for African Americans compared to White Americans (Hollis et al., 2008; Tussing-Humphreys, Fitzgibbon, Kong, & Odoms-Young, 2013), examination of race-ethnic

differences in factors related to physical activity and overweight are critical to improving the well-being of all youth.

Overall, bully victimization may negatively impact adjustment. In turn, this might reduce the physical activity levels of overweight and obese youth. Fortunately, bully victimization has been shown to be a salient and amenable target of intervention. Therefore, the relationship between these variables may be a fruitful area to explore further. Unfortunately, there is a paucity of research on the effect of bully victimization on physical activity. One goal of the current study was to explore how bully victimization may reduce physical activity of overweight and obese youth. Guided by the Transactional Stress and Coping Model (Thompson, Gil, Burbach, Keith, & Kinney, 1993a, 1993b; Thompson, Gustafson, Hamlett, & Spock, 1992a, 1992b), the model hypothesized increased bully victimization resulted in higher maladjustment. In turn, increased maladjustment reduced physical activity. The second goal of this study is to determine if the effect of bully victimization on physical activity varies among racial groups. Differences are expected. The final goal was to identify possible targets for intervention to reduce the deleterious effect of bullying on physical activity. Specifically, it is hypothesized that perceived parent and peer support may act as a protective factor in the link between bullying and physical activity. Previous research has shown family and peers influences on psychological adjustment, physical activity, and bullying.

CHAPTER II

LITERATURE REVIEW

Pediatric Obesity

Pediatric overweight (OW) and obesity (OB) are specific terms used to describe a youth's body weight relative to their same aged peers. The Center for Disease Control and Prevention (CDC, 2012) defines pediatric OB as a child or an adolescent with a body mass index (BMI) score at or above the 95th percentile for children of the same age and sex on the CDC 2000 Growth Charts. Pediatric OW is defined as a youth having a BMI at or above the 85th percentile. BMI is the ratio of an individual's weight to height. Although BMI is technically a measure of body weight as opposed to adiposity or "true" body fatness, BMI has been found to be a valid and practical assessment of child and adolescent overweight and obesity status (Mei, Grummer-Stawn, Pietrobelli, Goulding, Goran, & Dietz 2002). OW and OB develop from a sustained positive energy imbalance over time. In other words, OW/OB develops when a child or adolescent chronically consumes more calories than he or she expends.

A significant portion of America's youth is OW or OB, and there are important race and ethnic differences to consider. About of a third of American children and adolescents are either OW or OB (Ogden et al., 2014); however, OW/OB rates among African American (AA; 41.8%) and Hispanic/Latino American (41.2%) youth are generally higher than White American youth (WA; 29%; Ogden et al., 2010). Obesity rates are also rising faster among Hispanic and AA youth relative to the broader population (Ogden et al., 2010). Although Asian Pacific Islander American youth are at

a low-risk for obesity, differences exist once Asian and Pacific Islander children are considered separately. Samoan, Filipino, and Hawaiian youth have a greater risk for being overweight than other Asian and WA youth (Baruffi, Hardy, Waslien, Uyehara, and Krupitsky, 2004). Altogether, these findings indicate that race and ethnic minorities are at a greater risk for being OW/OB compared to their WA peers.

Explaining the racial/ethnic disparities in the prevalence of pediatric OW/OB is difficult due to the numerous factors contributing to a youth's energy balance (Booth et al., 2001; Ebbeling, Pawlak, and Ludwig, 2003; Kumanyika 2008). For example, the interaction of SES and race-ethnicity alone is very complex. Although the overall pediatric OW/OB prevalence is higher at lower SES levels for the general population, the OW prevalence rate is highest at higher SES levels among adolescent Hispanic male youth and AA female youth (Gordon-Larsen, Adair, and Popkin, 2003; Singh, Kogan, Van Dyck, and Siahpush, 2008). Furthermore, the results from a study by Gordon-Larsen, Adair, and Popkin (2003) suggest the prevalence in OW disparities would still exist if family income and education were equalized among racial groups. Given the youth's environment did not change in the simulation, the authors concluded income and education alone was unlikely to close the gap in weight disparities among racial minorities. Identifying targets of intervention most relevant for AA, Hispanic American, and Pacific Islander youth will be critical to reduce the obesity disparity among these populations

Adverse physical and mental health problems are prevalent among the OW/OB youth population. Physical health outcomes include problems such as hypertension,

sleep apnea, and asthma (See Daniels et al., 2005 for review). In particular, there is a concomitant rise of pediatric Type 2 diabetes mellitus in recent years. Once considered a disease only of adulthood, Type 2 diabetes puts children at greater risk for cardiovascular diseases. Although there is agreement that OB causes negative physical health problems, there is significant disagreement on whether OW/OB causes psychological maladjustment.

The relationship between OB and psychopathology has been the focus of debate for over 50 years (McElroy et al., 2004). As discussed in Friedman and Brownell (1995), the conclusion that individuals with OB experience psychopathology no more than their typical weight peers was the prevailing notion of reviews from the 1990's. In their review, Stunkard and Wadden (1992) concluded that OW/OB individuals do not experience more psychopathology in general than healthy weight individuals, but they do experience more weight related problems (e.g., body dissatisfaction) compared to healthy weight individuals. On the other hand, Friedman and Brownell (1995) rejected the conclusion that OW/OB did not carry risk for psychological problems on the basis that "inconsistent findings reflect an inconsistent phenomenon" (p. 3). The researchers outlined methodological issues of extant literature (e.g., study heterogeneity) that weakened the conclusion of the lack of impact of OW/OB on risk for psychopathology. Based on their review, they recommended less emphasis should be placed determining whether or not a causal relationship between OW/OB and psychopathology truly exists. Instead, focus should be placed for whom or under what conditions OW/OB and psychological maladjustment are related. Specifically, identifying mediators and

moderators (i.e., risk factors) of this relation in future research will be necessary in order to gain a complete understanding of psychological maladjustment in OW/OB youth.

Much research is still focused on answering the question: "Does obesity cause psychological problems?" however, the answer is still unclear. Part of the debate focuses on the possible bi-directional relationships between OB and maladjustment, specifically depression. That is, OB may be both a cause and consequence of depression. A systematic review of longitudinal studies revealed support for depression as both a cause and consequence of obesity (Luppino et al., 2010). Overall, OB individuals were found to have a 55% increased risk of developing depression compared to non-OB people, but when youth as a group (aged less than 20 years) were examined alone, no significant effect was found. It should be noted that a majority of included studies assessed depressive symptoms as opposed to a diagnosis of depression; however, the effect was found to be significantly stronger when depression was assessed by diagnostic interview and in studies with longer follow-up (≥10 years). Furthermore, individuals with depression had a 58% increased risk of becoming OB compared to healthy weight populations, generally. No significant age differences were found.

Likewise, Roberts and Duong (2013) found that youth with any mood disorder (mania, hypomania, major depression, and dysthymia) and youth with major depression had a two-fold-increased risk for becoming OB compared to the healthy weight controls after a 12 month follow up (Adjusted OR= 2.08 and 2.87, respectively). Youth who exhibited only depressive symptoms (depressed mood, irritable mood, or anhedonia) had a 36% increased risk for being OW compared to healthy weight controls. Roberts and

Duong conclude depression is more likely to be a cause of OB than a consequence. On the other hand, the researchers noted the influence of weight on depression may have been attenuated because of the short follow-up period and the lack of information on depression and weight trajectories. Thus, it remains unclear how weight gain and adjustment are linked. It could be possible, for example, for a well-adjusted, OW youth to be teased about their weight and develop depression. In youth, especially, these effects are important to consider given hormonal, metabolic, and behavioral changes during adolescence. Overall, there is tentative longitudinal support for a bi-directional relationship between depression and OB, at least in adults, and for OB as an outcome of depression in youth. It may also be informative to examine broader quality of life as an indicator of adjustment.

In addition to depression, the health-related quality of life (HRQOL) of OW, OB, and severely OB youth have been studied (Scwimmer, Burwinkle, and Varni, 2003; Swallen, Reither, Haas, and Meier, 2004; Williams, Wake, Hesketh, Maher, and Waters, 2005,). HRQOL is a comprehensive and multidimensional construct, which includes physical, emotional, social, and school functioning. Schimmer et al., (2003) examined the HRQOL in a clinical sample of 106 severely obese youth. On both child self-report and parent report of HRQOL, OB youth reported a significantly poorer quality of life across all domains. More importantly, the impairment to the quality of life was far more similar to youth with cancer than youth of healthy weight. This suggests that pediatric OB can be significantly disruptive to emotional and social functioning, or school life. Findings are mixed among community samples with respect the effect of pediatric OB

on HRQOL. Williams et al., (2005), found a significant difference between healthy weight and OW youth in overall HRQOL as well as the social subdomain. In contrast, Swallen et al., (2004) found no group differences among HRQOL subdomains, though overall group differences were found. It could be that parents and youth seek out treatment only when the OW condition significantly disrupts emotional, social, and/or school life. Taken together, overweight and obese youth experience significant problems in overall HRQOL; however, studies of HRQOL are largely cross-sectional. As is the case with depression, the influence of obesity on HRQOL may differ when studied longitudinally.

In summary, pediatric OW/OB are associated with significant adjustment and social problems; however, whether or not OW/OB carries a direct risk for psychological maladjustment remains unclear. Therefore, identification of conditions under which OW/OB youth are likely to experience maladjustment is necessary to inform ways of improving the mental health of these populations. In particular, bullying may be a critical factor in estimating the psychological maladjustment of OW/OB youth, given they are several times more likely to be victimized than non-overweight youth (Hayden-Wade, Richard, Ghaderi, Saelens, Zabinsk, & Wilfley, 2005).

The Effect of Bullying on Overweight and Obese Youth

Bullying is a unique form of aggression characterized by intentionality, repetitiveness, and an imbalance of power between the bullies and victims (Merrell, Gueldner, Ross, and Isava, 2008; Olweus, 1994; Olweus, 2013). Intentionality or intent to harm is the desire to cause harm, injury, or discomfort to the victim. Repetitiveness refers to repeated acts of aggression delivered to the victim; however, there is no standard for "repetitiveness". According to Olweus, who was one of the first researchers to define bullying, repetitiveness is evidence of intentionality, which is a construct that is difficult to directly measure (Olweus, 2013). Still, repeated acts have become a staple in bullying definitions (Merrell et al., 2008). Intentional and repeated acts differentiate bullying from other forms of aggression, such as situational or one time acts of aggression. Finally, a power imbalance refers to a difference in physical or social power between the bully and the victim, who has less power than the bully. Bullying behaviors can be described as physical (e.g., hitting, kicking, pushing), verbal (e.g., name calling, teasing), or social (e.g., intentionally excluding someone). These behaviors can also be categorized as direct (e.g., hitting, name calling) or indirect (e.g., exclusion, spreading rumors). Additionally, cyberbullying is emerging as a modern form of bullying. This involves the use of the internet or electronic devices (e.g., cell phones) to insult, threaten, embarrass, or otherwise harm a victim (Ybarra and Mitchell, 2004; Raskauskas and Stoltz, 2007; Juvonen and Gross, 2008).

Volk, Dane, and Marini (2014) have proposed a modern definition of bullying based off recent empirical studies and theory. This contemporary definition includes

three elements: goal-directedness, power imbalance, and harm. Goal-directedness is broader than just inflicting harm. These goals might include access to resources or enhancing one's social standing. Therefore, harm is not necessarily the primary reason for the bullying. Like Olweus (2013), Volk and colleagues also argue repetition is not necessary to the definition. Instead, considering frequency, intensity, and duration of the bullying and victimization is necessary to fully capture the broad spectrum of bullying behaviors.

According to the 2011 Youth Risk Behavior Surveillance System (CDC, 2012), approximately 20% of high school students report being bullied; however, overweight and obese youth are at a greater risk for being victimized by their peers than non-overweight youth (Neumark-Sztainer, Falkner, Story, Perry, Hannan, & Mulert, 2002; Janssen, Craig, Boyce, & Pickett, 2004; Hayden-Wade et al., 2005). Hayden-Wade and colleagues (2005) found 78% of the obese group reported appearance-related teasing, while 37% of the non-OW group reported experiencing similar teasing. Of those who were teased about their appearance, 90% of the OB sample reported weight-related teasing compared to 31.3% of non-overweight participants. The rate of bully victimization also increases with weight status. In one study, the percentage of average weight, OW, and OB girls who reported frequent weight teasing was approximately 18%, 28%, and 45%, respectively. Janssen and colleagues (2004) examined differences by type of bullying using a series of logistic regression analyses. Compared to average weight controls, OB youth were more likely to experience more verbal and relational bullying (i.e., intentionally being left out) as their BMI increased.

OW and OB youth also report their victimization experiences as more upsetting and chronic when compared to their healthy weight peers (Neumark-Sztainer et al., 2002; Hayden-Wade et al., 2005; Jones et al., 2005; Lumeng et al., 2010). OW children reported experiencing almost two more years of teasing compared to non-overweight peers (Hayden-Wade et a., 2005). In the Project EAT study, (Neumark-Sztainer et al., 2002), approximately 64% of OW and 70% of OB girls reported being bothered by weight teasing; about 43% of overweight and 40% of OB boys reported being bothered by teasing.

The bullying prevalence, chronicity, and the severity of overweight and obese youth may not be surprising given the increasingly pervasive weight-based stigmatization adopted by children (Richardson, Goodman, Hastorf, & Dornbusch, 1961; Latner and Stunkard, 2003; Strauss and Pollack, 2003; Puhl and Brownell, 2003; Puhl and Latner, 2007; Puhl and Heuer, 2012). Broadly defined, a stigma is the co-occurrence of labeling of persons, stereotyping, separation of "us" and "them", status loss, and discrimination (Link and Phelan, 2001). Weight stigma can be considered negative weight-related attitudes and beliefs towards OW/OB individuals. Children, as young as 10, have been shown to stigmatize OW children (Richardson et al., 1961; Latner and Stunkard, 2003). These beliefs are manifested in different ways such as bullying, bias, and social rejection (Puhl and Latner, 2007). Thus, it is not surprising that OW youth have been shown to cite *peers in general* as the *most critical* source of teasing more often than healthy weight youth (Hayden-Wade et al., 2005). Similar criticism is ubiquitous during adulthood (Andreyeva, Puhl, and Brownell, 2008).

Youth who are bullied experience significant psychological maladjustment. Reviews of both cross-sectional and longitudinal studies reveal bullying victimization as a significant risk factor for maladjustment (Hawker and Boulton, 2000; Gini and Pozzoli, 2008; Reijntjes, Kamphuis, Prinzie, and Telch, 2010; Arseneault, Bowes, and Shakoor, 2010; Ttofi, Farrington, Losel, and Loeber, 2011). Overall, youth who are bullied exhibit both severe internalizing problems such as anxiety, depression, and loneliness, as well as externalizing problems, such as violence and conduct problems. Studies also find very severe symptoms associated with bullying, such as self-harm (Hawker and Boulton, 2000; Arseneault, Bowes, and Shakoor, 2010). As it is with OB and depression, there is debate over whether psychological maladjustment is a consequence or cause of bullying. In a meta-analysis of over 20 longitudinal studies, participants who were bullied were about twice as likely to develop depression even after controlling for covariates of depression. Although this provides evidence bullying does indeed carry a unique risk for depression, the causal mechanism is still unknown (See Arsenault et al., 2010 for a review).

Bullying has also been shown to be negatively associated with cognitive and behavioral outcomes commonly related to overweight and obesity (Storch et al., 2007; Faith et al., 2002; Hayden-Wade et al., 2005) Faith et al., (2002) found a negative relationship between reported weight criticism during physical activity and sports enjoyment, perceived physical activity, and mild physical activity compared to healthy weight peers. Hayden-Wade and colleagues (2005) also found that weight related teasing is related to increased weight concerns, lower preference for physical activities, and a

greater preference for sedentary activities. Additionally, weight loss has been shown to predict improvement in fear of negative evaluation and weight related teasing in a clinical sample of overweight youth (Rancourt et al, 2014).

Given that OW and OB youth possess a risk for bully victimization and youth who are bullied carry a risk for maladjustment, it is important to examine how these factors relate altogether. As previously discussed, the results of a study by Storch and colleagues (2007) revealed that loneliness and depression act as a mediator in the relationship between bullying and physical activity. Jensen and Steele (2009) found a significant interaction effect of body dissatisfaction and weight criticism during activity on physical activity. Specifically, among girls who reported higher body dissatisfaction, physical activity decreased as criticism increased. These studies suggest that bullying could have a deleterious impact on youth physical activity. Such a conclusion is supported by the findings in adult literature that indicate depression is longitudinally related to declines in physical activity (Roshanaei-Moghaddam, Katon, and Russo, 2008), though the reverse relationship has also been supported (Teychenne, Ball, and Salmon, 2008).

In summary, bullying is more prevalent and severe among OW and OB youth. This may be due to the pervasive weight-stigma among children and adolescents. Furthermore, bullying might explain the relationship between OB and maladjustment. In other words, only OW or OB youth who are bullied to a significant degree may be at risk for maladjustment, but more research is needed in this area. Bullying and stigma may

potentially be targets for intervention to improve the psychological adjustment as well as the weight management behaviors of OW and OB children.

The Effect of Peer and Family Support

Given the pervasive nature of bullying and weight stigma, these factors may not be easy to change directly through intervention. Thus, factors that protect youth from the adverse effects of bullying are important to consider. Social support may be a protective factor from the negative effects of bully victimization on psychological adjustment (Rigby, 2000; Malecki and Demaray, 2003; Kochenderfer-Ladd and Skinner, 2002; Davidson and Demaray, 2007; Rueger, Malecki, and Demaray, 2010). Decreased supports from parents and peers have been shown to longitudinally predict increased depressive symptoms in youth (Rueger, Malecki, and Demaray, 2010). In a study of 355 middle school students, peer and parent support (social support) moderated the relationship between bullying and maladjustment (i.e., internalizing distress; Malecki and Demaray, 2003). Specifically, parent support for girls and peer support for boys moderated this relationship such that the more the participants reported social support the less internalizing problems they reported. Also, when participants reported less social support, they reported more internalizing problems. The results of a study by Kochenderfer-Ladd and Skinner (2002) reveal girls seek social support as a way to cope with bully victimization. Parents can knowingly or unknowingly act as sources of weight-based teasing and consequently contribute to maladjustment problems (Neumark-Sztainer, Story, and Faibish 1998; Neumark-Sztainer et al., 2002; Eisenberg, Neumark-Sztainer, and Story, 2003); however, parental involvement has been shown to

be an important component to effective weight management programs (Epstein, 1996, Epstein, Paluch, Roemmich, & Beecher, 2004; Berry, Melkus, Savoye, and Grey, 2007; Savoye et al. 2007).

In summary, parental and peer support may be adaptive for victimized youth, but less is known about the relationship between social support and weight-based teasing in youth who are overweight or obese.

Expanding the Literature

The current study aimed to expand the existing literature in three ways. First, only a limited number of studies have explored the mechanism by which bullying influences physical activity in OW/OB youth. As discussed, bullying and maladjustment have individually been linked to reduced physical activity. Bullying is also associated with maladjustment. By examining these relationships together, the mechanism by which bullying might negatively impact physical activity in OW/OB youth populations may be better understood. Second, racial-ethnic differences in the relationship between bullying and physical activity have been under explored. Racial-ethnic differences are expected given group differences in a variety of weight related variables such as physical activity, body satisfaction, and dieting (Neumark-Sztainer et al., 2002). Finally, parent and peer support was explored as possible protective factors from the negative effects of victimization.

Transactional Stress and Coping Model

This study was guided by the Transactional Stress and Coping (TSC) model (Figure 1). Set within Bronfenbrenner's (1979) ecological-systems theory (EST), TSC

proposes the relationship between an illness and outcome can be explained by the transactions of illness parameters, demographic parameters, and adaptational or mediational processes (Thompson & Gustafon, 1996). Illness parameters refer to the type and severity of an illness. Illness related stressors have also been studied as an illness parameter. In a study of youth with sickle cell disease (SCD), Gold, Treadwell, Weissman, and Vichinsky (2007) examined the effect of emergency room (ER) visits on sibling adjustment given that frequent ER visits are disruptive to the family. ER visits were considered as the illness parameter in their model. SES, race-ethnicity, and gender are considered demographic factors. Adaptational processes refer to the protective family characteristics and youth characteristics. Family level factors can include coping, efficacy, stress appraisal, and the locus of control, for example. Individual self-esteem, coping, and the locus of control could also be considered youth level processes. These adaptational processes are hypothesized to mediate the effect of illness parameters on the adjustment of the ill child and the family.

Several studies have been used to test this model (Thompson et al., 1994; Gold et al., 2007; Ryan et al., 2010). Thompson and colleagues (1994) found that negative thinking accounted for increases in self-reported internalizing and externalizing symptoms in children coping with pain related to their SCD. Further, results from Gold et al., (2007) show family adaptational processes mediate the relationship between ER visits of children with SCD and the sibling's adjustment. Ryan and others (2010) found that parental distress temporally predicted the adjustment of children with Juvenile rheumatic diseases.

Proposed Model

The adjusted TSC model (Figure 2) expands the TSC model in several ways. First, bully victimization is considered the illness parameter for OW and OB condition. As discussed, marked bully victimization co-occurs with OW/OB. The victimization is often also focused on weight and appearance. Evidence also suggests victimization becomes more severe as weight status increases. Therefore, victimization may exacerbate psychological maladjustment (e.g., internalizing symptoms) in OW/OB youth populations. Since adjustment tends to be worse in clinical OW populations compared to community samples, the severity of bullying may be a contributor to the severity of the illness. In other words, bullying may exacerbate the experience of pediatric OW and OB for youth. Thus, bully victimization is considered a critical feature of pediatric OW and OB to examine.

Second, the proposed model includes parental and peer support as adaptational processes. As previously discussed, parental and peer support may buffer against internalizing symptoms for victimized youth. Additionally, one study revealed that seeking social support may be a coping strategy used by victimized youth. Therefore, seeking parental and peer support may be an adaptive process for overweight and obese youth, because support may act as a source of coping. Peer support will be examined as a possible mediator in the relationship between bully victimization and internalizing symptoms. Parental support used as a covariate with bully victimization and a predictor of internalizing symptoms. Finally, physical activity is considered an outcome of internalizing symptoms.

In light of the previous research, it was predicted that 1) increased bully victimization will be associated with an increased internalizing symptoms and, in turn, higher levels of internalizing symptoms will be correlated with reduced physical activity, 2) parental and peer support will each be negatively related with bully victimization and internalizing symptoms, and 3) racial and weight status differences are expected.

CHAPTER III

METHODS

Sample and Data Collection Methods

The 2005-2006 United States, public use data of the Health Behavior in School-Aged Children (HBSC) dataset will be used in the current study. This data consists of a longitudinal, nationally representative sample of school-aged youth collected by The CDM Group, Inc., Bethesda, MD and prepared for release by the Prevention Research Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

The HBSC used a three-stage stratified sampling design. The stages included school districts, school, and school classes. Census division (9 census divisions) and school grade level (grade 6, 7, 8, 9, and 10) were used for stratification. In order to obtain a nationally representative sample, African American and Hispanic students were oversampled. In the first stage, one or more school districts of public schools were stratified within each of the nine Census Divisions. The primary sampling unit (PSU) included one or more school districts. Each PSU had at least 10 schools. Rural school districts within a county were grouped together into one PSU, while school districts with very large enrollments were considered as a separate PSU. A total of 1,540 PSUs were created, and 100 PSUs were sampled. Catholic and private schools were assigned to a PSU based on their location to the 1,540 PSUs.

In the second stage, schools were selected from the sampled 100 PSUs (i.e., school districts). A total of 529 schools were originally contacted during data collection,

and information was collected from 327 schools. Only data from 227 schools are included in the public use dataset used in the current study. Finally, in the third stage, classes were sampled from selected schools designated for sampling students from a specific grade. Within the 227 schools, 10,577 students were eligible and 9,227 students participated in the study (87.2% student response rate). About a half of the students in the 6th grade were randomly selected to complete the questionnaire without the bullying items, and only WA and AA students were included in the study. Therefore, the final sample was $N = 4509$.

Student assent and parental consent were obtained. The students anonymously completed the self-report surveys designed for their grade level. Two versions were created for the 6th grade, one created for the 7th to the 9th grade, and one created for the 10th grade. School representatives (e.g., teacher, nurse, counselor) administered surveys in regular classrooms; surveys took approximately 45 minutes to complete. The 2005-2006 HBSC survey asked questions about nutrition, physical activity, violence, bullying, relationships with family and friends, perceptions of school as supportive environments, and substance (alcohol, tobacco, and marijuana) use.

Demographic measures included race/ethnicity and weight status. Race/ethnicity groups included WA and AA. Weight status was determined by the participants BMI. BMI was computed from self-reported height and weight according to the 2000 CDC growth charts. Youth with BMI scores $\geq$85th percentile (i.e., overweight or obese) were considered Overweight (OW), and youth with BMI scores between the 5th and 85th percentile were considered Healthy Weight (HW). Thus, four groups were created from

these measures: White Healthy Weight (WHW), African American Healthy Weight (AAHW), White Overweight (WOW), and African American Overweight (AAOW).

Table 1 reveals the sample size, gender, and grade percentages by groups. There were a total of 4509 participants. Overall, participants were primarily WA (72%) and HW (69%). There were slightly more female participants (52%). Approximately 53% of participants were WHW, 20% WOW, 17% AAHW, and 11% AAOW. Furthermore, about 28% of WA participants and 40% of AA participants were overweight or obese in the sample, which closely aligns with the national overweight prevalence. In regard to grade level, about 13% were in 6^{th}, 22% in 7^{th}, 23% in 8^{th}, 20% in 9^{th}, and 22% in 10^{th}. This distribution is was similar for the four groups.

Measures

Five items assessing physical, verbal, and relational bullying assessed bully victimization (BUL; $\alpha = .827$). These items were based on the Olweus Bully/Victim Questionnaire. In the survey, being bullied was defined as "when another student, or a group of students, say or do nasty or unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she does not like or when they are deliberately left out of things." The first item asked, "How often have you been bullied at school in the past couple of months?" Follow up items inquire about the frequency of certain types of bulling. For example, "I was called mean names, was made fun of, or teased in a hurtful way." The participant can respond with: none, only once or twice, 2 or 3 times a month, about once a week, or several times a week.

Parent support (PAR) was measured by eight items regarding parent support (α = .79). For example, some items asked whether the student's parent/guardian "helps me as much as I need", "lets me do things I like doing", and "is loving". Two items ("Tries to control things I do", "Treats me like a baby") were reverse scored. Response choices include: never, sometimes, or always.

Peer support (PES) was measured by three items (α = .74). Three items asked "How easy is it for you to talk to…" a best friend, friends of the same sex, and friends of the opposite sex. Response choices also range from very easy to very difficult.

Internalizing Symptoms (INT) was measured by six items (α = .798). These items asked how often the participant experienced internalizing symptoms in the past 30 days. Responses ranged from always to never.

Physical activity (PHS) level was measured by three items (α = .731). One item asked for the number of days the participant was physically active in the past week. Another item asked how often the participant exercised so they were out of breath. Finally, participants were asked to report the number of hours exercised per week.

Statistical Analyses

Structural equation modeling (SEM) was used to examine the fit of the entire proposed model with the sample data. SEM refers to a family of statistical techniques for examining complex research questions using observed data (e.g., report of mood, appetite, fatigue) to draw conclusions about unobservable constructs (e.g., depression). This ability to use several indicator variables to construct latent variables is a major strength of SEM techniques (Kline, 2010). By analyzing latent variables, measurement error or unreliability can be captured within the model. Theoretically, analyses are then conducted with accurate, or "error-free", variables, which results in the accurate estimation of relationships between latent variables (Kline, 2010). Furthermore, the HBSC data is considered complex survey data (i.e., multilevel), because it was obtained through stratification and the unequal probability of selection (Muthen and Muthen, 2010). One approach to analyzing complex survey data is to compute standard errors and a chi-square test of model fit while taking into account the multilevel structure of the data (Muthen and Muthen, 2010). Sampling weights can be used to account for stratification and the unequal probability of selection (Asparouhov, 2006). Sample weights at each level were calculated and included in the public use dataset; however, the sample weights do not apply to the current study's sample. Thus, the sampling weights were not used. This study used multigroup SEM in order to examine whether the same relationships hold across the four different groups.

CHAPTER IV

RESULTS

Preliminary Analyses

Preliminary analyses were conducted with SPSS (IBM Corp, 2011) in order to determine whether the data met normality assumptions of SEM. Descriptive statistics, including means, standard deviations, skewness, and kurtosis, were computed for each item (Table 2). One bullying question ("Hit, kicked, punched") violated the normality assumption (i.e., Skewness $\geq$3.0 and/or Kurtosis $\geq$10; Kline, 2010). Therefore, the natural log (ln) of the item was used in order to normalize the data. Furthermore, only a small percentage of data were missing (*Range* = 0.5 - 2.5%) and no discernable patterns of missingness were observed. Full information maximum likelihood (FIML) was also used, which generated maximum likelihood based statistics for missing data.

SEM Analyses – Multiple Group CFA

Multiple group SEM techniques were used to evaluate study hypotheses. Chi-Square (χ^2), Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Comparative Fit Index (CFI), and the ratio of chi-square to degrees of freedom (Relative X^2) assessed model fit. Chi-square estimate with a $p < 0.05$ is considered "good fit". This condition would suggest the model perfectly fit the data, but a non-statistically significant chi-square shows the lack of perfect fit. Note chi-square tests are sensitive to large sample sizes. Small deviations between two nested models can be inflated by a large sample size and subsequently bias chi-square difference tests toward significance. Therefore, Relative X^2 was used to address the

sample size limitation. Estimates ≤ 3 are considered "good fit". Standards of "good fit" for RMSEA and SRMR are <0.05. A "fair fit" range for RMSEA and SRMR are 0.05 to 0.08. In regard to CFI, values closer to 1.0 indicate better model fit compared to a highly restricted model. Values ≥ 0.90 are considered to be "fair fit" and values ≥ 0.95 are considered "good fit".

Invariance testing is typically conducted with a chi-square difference test (X^2_D). Again, minor differences in parameter estimates tend to result in statistically significant X^2_D when sample sizes are very large (Cheung and Rensvold, 2002; Meade, Johnson, and Braddy, 2008). Approximate fit indexes can be used when working with very large sample sizes (Kline, 2010). This study used change in CFI (Δ CFI) to assess invariance. Δ CFI values ≤.01 (Cheung and Rensvold, 2002) and ≤.002 (Meade et al., 2008) might indicate small deviations from perfect measurement invariance are minor. In other words, the null hypothesis (i.e., invariance) should not be rejected. Both thresholds were considered in determining invariance.

First, a measurement model was created for the WHW, WOW, AAHW, and AAOW groups separately. The baseline model for each group is shown in Figure 3. Modifications to the baseline model were based on modification indices in the context of theory. The fit of the models for each group were considered "good" overall (Table 2).

Second, factorial invariance tests were conducted (Table 3 and Table 4). The Configural model tests configural invariance (i.e., same number of common factors for each group). Factor loading invariance was revealed by testing weak or metric invariance by the Metric model. Loading and intercept invariance was tested by the

Scalar model. Invariance for factor loadings (Metric Model) is especially important, because group differences in factor loadings can create group differences in means, variances, and correlations. Table 4 shows measurement invariance held for the Configural and Metric models, but not the Scalar model. Model fit did not significantly change from the Configural to Metric model (Δ *CFI* = 0.006) and from the Metric to Scalar model (Δ *CFI* = 0.006). In contrast, the fit of the Scalar model was significantly different than the Configural model (Δ *CFI* = 0.012). The comparison of the fit indices of the Configural and Scalar models (Table 3) revealed the Scalar model had a poorer fit compared to the Configural model. Therefore, scalar invariance was not established. Meaningful comparisons between factor loadings and parameter estimates can be made, but comparisons between factor means cannot be interpreted.

SEM Analyses - Structural

Third, the hypothesized structural model fit was examined (Figure 4). Overall, the model fit the data well. Tables 6 to 9 show selected *understandardized* parameter estimates, S.E., Est./S.E., and two-tailed p-value for each group studied in the structural model. Comparison of just the parameter estimates can be made using Table 10. Evaluation of these results revealed support for the hypothesized structural path directions for all groups except for the path between peer support (PES) and internalizing symptoms (INT), which was not statistically significant (Figure 5). Bully victimization (BUL) had a negative association with both PES and parent support (PAR) such that increased bullying was associated with a decrease in parent and peer support. In turn, increased levels of PAR and PES were each related to lower levels of INT;

however, the association between PES and INT was not statistically significant from zero. This indicated increased parent support, but not peer support, led to improved internalizing symptoms. Finally, higher levels of INT correlated with lower levels of physical activity (PHS).

The total effect of BUL to INT was approximately equal to the direct effect of BUL to INT while the indirect effect of BUL to PES to INT was not statistically significant from zero (Table 11). Table 12 revealed the total effect of BUL to PHS was virtually completely accounted for by the specific indirect effect of BUL to INT to PHS. Therefore, the hypothesis that PES would mediate the relationship of BUL to INT was not supported by the results.

Finally, parameter estimates can be compared among the four groups (Table 5). First, PES did not influence INT among all four groups. Second, for the BUL and PAR, BUL and INT, and INT on PHS relationships, the parameter estimates appear comparable. Third, the PAR and INT negative relationship was greater (i.e, more negative) for the WA groups compared to the AA groups. This suggests as parent support increases, internalizing symptoms decrease at a faster rate among the WA participants than the AA participants regardless of weight status. Fourth, in the negative relationship between BUL and PER, comparable estimates were found for the WHW and the WOW group. In contrast, the AAOW estimate was the strongest of the four groups (i.e., most negative), and the AAHW group was the weakest (i.e., least negative). This suggests bully victimization affects the perceived peer support of WA youth similarly regardless of different weight statuses, but the negative effect of bully victimization on

AA's perceived peer support differs by weight status. racial differences hypothesis was supported.

CHAPTER V

DISCUSSION

Guided by the Transactional Stress and Coping (TSC) framework, the primary purpose of this study was to explore the whether parent and peer supports could buffer against the negative effects of bullying in order to promote physical activity in overweight youth. The secondary purpose was to examine racial differences in order to glean insights in developing culturally appropriate theory and interventions.

Bullying has been shown to have negative effects on psychological maladjustment (e.g., depression, loneliness, internalizing problems). The influence of maladjustment on physical activity has also been studied; however, only a limited number of studies have considered the mechanism by which bullying influences physical activity, especially in overweight and obese youth populations. Given the modest effectiveness of physical activity interventions and the high rate of bullying among overweight populations, a theory driven understanding of this mechanism seems to be necessary to guide research and ultimately design effective physical activity intervention. Second, racial differences between bullying and physical activity is relatively underexplored. Racial-ethnic differences have been observed across many domains such as bullying, maladjustment, physical activity, and response to weight loss as well as physical activity interventions. Therefore it is critical to understand racial differences in order to develop theory and design intervention applicable to all races and ethnicities.

This study utilized an existing, nationally representative, and complex survey sample of 4509 White and African American youth who were either healthy weight, overweight, or obese. Multiple group structural equation modeling was used to explore the relationships between bully victimization, peer support, parent support, internalizing symptoms, and physical activity, as well as racial differences among these relationships. Unfortunately, due to the lack of scalar invariance, between-group comparisons were limited.

Generally, results showed support for the hypothesized model for all groups. Bullying seemed to negatively impact physical activity through internalizing symptoms, which is consistent with the literature. This study adds that these relations are true for healthy and overweight White and African Americans. Furthermore, parental support, but not peer support, appeared to act as buffer between bullying and internalizing symptoms. Again, these patterns were observed for both racial and weight status groups.

The Transactional Stress and Coping framework, which emphasized the influence of family-level factors, served as an appropriate model for both White and African American overweight youth. The model seemed to predict the buffering effect of parental support (i.e., family level adaptive process) on the relationship between bullying and internalizing symptoms, which reduced physical activity as internalizing symptoms increased. Furthermore, the TSC model seemed applicable to both African American and White American youth of different weight statuses, given the consistent findings across groups. A theoretical implication is it may be helpful to conceptualize bullying as a stressor related to the overweight and obese health condition. Furthermore, bullying

might be a stressor to which African and White American families must adapt in order to promote physical activity. This supports the trend that parent level components have become important in obesity and school-bullying interventions (Ttofi and Farrington, 2011). Including parental components may also be important in the study of weight stigma intervention, given weight stigma can be manifested as bullying. Another theoretical implication is the maladjustment role of other variables or multidimensional variables (e.g., HRQOL) in the relationship between bullying and physical activity can be examined. For instance, in a longitudinal study, bullying predicted changes in BMI by way of self-concept and internalizing symptoms for girls and self-concept only for boys (Adams and Bukowski, 2008). Future research focusing on these variables and racial-ethnic differences may further explain how bullying might impact physical activity.

Peer support did not appear to be a salient variable in the relationship between bullying and internalizing symptoms. Though peer support was found to be negatively associated with bullying, the lack of relationship between peer support and internalizing symptoms was unanticipated. This was especially surprising, because the null finding was consistent across all groups. Previous research has demonstrated the protective effects of peer support from bullying and in promoting physical activity (Fitzgerald, Fitzgerald, and Aherne, 2012). Measurement concerns may explain this unanticipated finding. In this study, peer support was defined broadly with items asking "How easy is it for you to talk to…" certain peers. Though there is no perfect measure of peer or social support, many studies utilize multidimensional measures of social support (e.g., Kochenderfer-Ladd and Skinner, 2002). Future research utilizing a multidimensional

measure with improved psychometric properties, such as the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, and Farley, 1988), should be conducted in order to confirm the role of peer support in this model. A second possibility is other peer related variables might impact internalizing symptoms. Presence of peers, peer norms, friendship quality, acceptance, and peer crowd affiliation all have been shown to relate to physical activity (Fitzgerald, et al., 2012). Friendships self-disclosure (about victimization) found to buffer the effect of bullying on depressive symptoms. Examining these or similar factors within a TSC framework as within-child factors (e.g., perception of acceptance or crowd affiliation) in future studies might help outline the role of peers. Third, as previously mentioned, the type of social support (i.e., parent and/or peer support) that has protective effects may differ by gender. This study did not consider boys and girls separately. Examining gender groups separately may result in different findings.

Based on this study alone, it is difficult to say whether parent support is more influential than peer support as in the relationship between bullying and physical activity. On the one hand, peers play a critical role in establishing social norms and identity, especially as youth age and spend more time with friends. These factors can influence healthy behaviors. Again, many peer related factors are related to physical activity (Fitzgerald, et al., 2012). For instance, in one study, youth who reported affiliation with the “Brains”, the “Jocks”, and the “Populars” crowds also reported healthier dieting and exercise (Mackey and La Greca, 2007).

On the other hand, peers in general play a complicated role in bullying. In the bullying literature, the effect of bystanders on bullying outcomes is often studied (see Polanin, Espelage, & Pigott, 2012 for review). A bystander is an individual who is present during the bullying act, but are neither the bully nor the victim (Twemlow, Fonagy, and Sacco, 2004). Bystanders are categorized into one of four roles: reinforcer (e.g., laughing at the victim), assistant (e.g., supporting the bully), defender (e.g., supporting the victim), and outsider (e.g., walks away from the situation). For school-aged children, bystanders are typically their peers. Though bystander interventions have been shown to be effective at reducing victimization (Polanin, Espelage, and Pigott, 2012), peer targeted components of bullying interventions may not be effective or as effective compared to adult targeted components (Ttofi and Farrington, 2011). Thus, there is evidence to suggest targeting parents and adults (e.g., teachers) may be effective at creating change at the peer level. Future studies might examine specific forms of parent support (e.g., support in weight loss, support with bully victimization) and their influence of peer related factors as well as adjustment.

Though the lack of scalar measurement invariance limited comparison among groups, some group differences were observed among parameter estimates (i.e., slope). Notably, the negative relationship between parental support and internalizing symptoms was largest for both White groups compared to the African American groups. In other words, parental support may influence internalizing symptoms to a greater degree for White youth compared to African American youth; however, it is important not to underestimate the importance of family support for both groups. Instead, African

American youth may require support from additional sources such as other family members (e.g., siblings, aunts, grand parents).

Another possibility is overweight and obese White American youth find bullying more stressful than African American youth. Thus, parental support would be more impactful on internalizing problems for overweight White youth. Indeed, African American youth are more tolerant of a wider range of body sizes (Whaley, Smith, and Hancock, 2011; Witherspoon, Latta, Wang, and Black, 2013). That being said, the question remains whether African American youth and their families experience more stress related to bullying and weight related bullying, specifically. Future studies should examine this question further.

There are several methodological limitations to consider when generalizing these conclusions. First, this study utilized a cross-sectional design. Longitudinal studies are needed to confirm the direction of the relationships found in this study. Second, variables were measured with questions pulled from a larger survey. Future research with measures with improved and well-established psychometric properties is needed to confirm this study's findings. Third, this study collapsed overweight and obese participants into one group (i.e., overweight). Results may differ if the two groups were considered separately. For example, Witherspoon and colleagues (2013) found that obesity but not overweight was associated with poorer adjustment outcomes in African American youth. A follow-up study should be conducted in order to confirm the findings hold true for both overweight and obese youth when considered separately.

In conclusion, targeting the social and emotional symptoms experienced by overweight and obese youth may play an important role in reducing the prevalence of overweight and obesity. Though youth are unlikely to lose significant weight just because they are no longer bullied, addressing bullying, stigma, and their effects may help breakdown the everyday social and emotional barriers to physical activity.

REFERENCES

Adams, R. E., & Bukowski, W. M. (2008). Peer victimization as a predictor of depression and body mass index in obese and non-obese adolescents. *Journal of Child Psychology and Psychiatry, 49*(8), 858-866.

Andreyeva, T., Puhl, R. M., & Brownell, K. D. (2008). Changes in perceived weight discrimination among Americans, 1995–1996 through 2004–2006. *Obesity*, *16*(5), 1129-1134.

Arseneault, L., Bowes, L., & Shakoor, S. (2010). Bullying victimization in youths and mental health problems: "Much ado about nothing"? *Psychological Medicine*, *40*(5), 717–29. doi:10.1017/S0033291709991383

Asparouhov, T. (2006). General multi-level modeling with sampling weights. *Communications in Statistics—Theory and Methods*, *35*(3), 439-460.

Baruffi, G., Hardy, C. J., Waslien, C. I., Uyehara, S. J., & Krupitsky, D. (2004). Ethnic differences in the prevalence of overweight among young children in Hawaii. *Journal of the American Dietetic Association*, *104*(11), 1701–7.

Berry, D., Melkus, G., Savoye, M., & Grey, M. (2007). An intervention for multiethnic obese parents and overweight children. *Applied Nursing Research, 20*(2), 63-71.

Borraccino, A., Lemma, P., Iannotti, R, Zambon, A., Dalmasso, P., Lazzeri, G., Giacchi, M., & Cavallo, F. (2009). Socioeconomic effects on meeting physical activity guidelines: Comparisons among 32 countries. *Medicine and Science in Sport and Exercise, 41*(4), 749–56.

Booth, S. L., Sallis, J. F., Ritenbaugh, C., Hill, J. O., Birch, L. L., Frank, L. D., ... & Hays, N. P. (2001). Environmental and societal factors affect food choice and physical activity: Rationale, influences, and leverage points. *Nutrition Reviews*, *59*(3), S21-S36.

Bronfenbrenner, U. (1979). *The Ecology of Human Development: Experiments by Nature and Design.* Cambridge, MA: Harvard University Press.

Centers for Disease Control and Prevention (CDC). (2011, November 9). *How much physical activity do children need?*

Retrieved from http://www.cdc.gov/physicalactivity/everyone/guidelines/children.html

Centers for Disease Control and prevention (CDC). (2012, April 27). *Basics about childhood obesity*.

Retrieved from http://www.cdc.gov/obesity/childhood/basics.html

Centers for Disease Control and Prevention (2012). Youth Risk Behavior Surveillance – United States, 2011. *Morbidity and Mortality Weekly Report, 61*(4).

Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., … Williams, C. L. (2005). Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*, *111*(15), 1999–2012.

Davidson, L. M., & Demaray, M. K. (2007). Social support as a moderator between victimization and internalizing-externalizing distress from bullying. *School Psychology Review, 36*(3), 383-405.

Ebbeling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: Public-health crisis, common sense cure. *The Lancet*, *360*(9331), 473-482.

Epstein, L. H. (1996). Family-based behavioural intervention for obese children. *International Journal of Obesity and Related Metabolic Disorders, 20*(Suppl 1) S14-S21.

Epstein, L. H., Paluch, R. A., Roemmich,J. N., & Beecher, M. (2007). Family-based obesity treatment, then and now: Twenty-five years of pediatric obesity treatment. *Health Psychology, 26*(4), 381-391.

Eisenberg, M. E., Neumark-Sztainer, D., & Story, M. (2003). Associations of weight-based teasing and emotional well-being among adolescents. *Achieves of Pediatrics & Adolescent Medicine, 157*(8), 733-738.

Faith, M., Leone, M., & Ayers, T. (2002). Weight criticism during physical activity, coping skills, and reported physical activity in children. *Pediatrics*, *110*(2). Retrieved from http://www.pediatricsdigest.mobi/content/110/2/e23.short

Fitzgerald, A., Fitgerald, N., &Aherne, C. (2012). Do peers matter? A review of peer and/or friend's influence on physical activity among American adolescents. *Journal of Adolescence, 35*(4), 941-958.

Friedman, M. A, & Brownell, K. D. (1995). Psychological correlates of obesity: Moving to the next research generation. *Psychological Bulletin*, *117*(1), 3–20.

Gini, G., & Pozzoli, T. (2009). Association between bullying and psychosomatic problems: A meta-analysis. *Pediatrics*, *123*(3), 1059–1065.

Gold, J. I., Treadwell, M., Weissman, L., & Vichinsky, E. (2011). The mediating effects of family functioning on psychosocial outcomes in healthy siblings of children with sickle cell disease. *Pediatric Blood & Cancer,* 57(6), 1055–1061.

Gordon-Larsen, P., Adair, L., & Popkin, M. (2003). The relationship of ethnicity, socioeconomic factors, and overweight in U.S. adolescents. *Obesity Research,* 11(1), 121-129.

Gordon-Larsen, P., Nelson, M. C., & Popkin, B. M. (2004). Longitudinal physical activity and sedentary behavior trends: Adolescence to adulthood. *American Journal of Preventive Medicine*, *27*(4), 277–283.

Gray, W. N., Janicke, D. M., Ingerski, L. M., & Silverstein, J. H. (2008). The impact of peer victimization, parent distress and child depression on barrier formation and physical activity in overweight youth. *Journal of Developmental and Behavioral Pediatrics*, *29*(1), 26–33.

Guo, S. S., Wu, W., Chumlea, W. C., & Roche, A. F. (2002). Predicting overweight and obesity in adulthood from body mass index values in childhood and adolescence. *The American Journal of Clinical Nutrition*, *76*(3), 653–8.

Hampel, P., Manhal, S., & Hayer, T. (2009). Direct and relational bullying among children and adolescents: Coping and psychological adjustment. *School Psychology International*, *30*(5), 474–490.

Hawker, D. S., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *41*(4), 441–55.

Hayden-wade, H. A., Stein, R. I., Ghaderi, A., Saelens, B. E., Zabinski, M. F., & Wilfley, D. E. (2005). Prevalence, characteristics, and correlates of teasing experiences among overweight children vs. non-overweight peers. *Obesity Research*, *13*(8), 1381-1392.

Hollis, J. F., Gullion, C. M., Stevens, V. J., Brantley, P., Appel, L., Ard, J., … & the Weight Loss Maintenance Research Group. (2008). Weight loss during the intensive intervention phase of the weight-loss maintenance trial. *American Journal of Preventative Medicine, 35*(2), 118-126.

IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.

Janssen, I., Craig, W. M., Boyce, W. F., & Pickett, W. (2004). Associations between overweight and obesity with bullying behaviors in school-aged children. *Pediatrics*, *113*(5), 1187-1194.

Janssen, I., Katzmarzyk, P. T., Boyce, W. F., Vereecken, C., Mulvihill, C., Roberts, C., … Pickett, W. (2005). Comparison of overweight and obesity prevalence in school-aged youth from 34 countries and their relationships with physical activity and dietary patterns. *Obesity Reviews*, *6*(2), 123–32.

Jensen, C. D. & Steele, R. G. (2009). Brief report: Body dissatisfaction, weight criticism, and self-reported physical activity in preadolescent children. *Journal of Pediatric Psychology, 34*(8), 822-826.

Jones, D. C. & Crawford, J. K. (2005). The peer appearance culture during adolescence: Gender and body mass variations. *Journal of Youth and Adolescence, 35*(2), 257-269.

Juvonen, J., & Gross, E. F. (2008). Extending the school grounds?—Bullying experiences in cyberspace. *Journal of School Health*, *78*(9), 496-505.

Kimm, S. Y., Glynn, N. W., Kriska, A. M., Barton, B. A., Kronsberg, S. S., Daniels, S. R., ... & Liu, K. (2002). Decline in physical activity in black girls and white girls during adolescence. *New England Journal of Medicine*, *347*(10), 709-715.

Kline, R. B. (2010). *Principles and Practice of Structural Equation Modeling.* New York, NY: Guilford.

Kochenderfer-Ladd, B., & Skinner, K. (2002). Children's coping strategies: Moderators of the effects of peer victimization? *Developmental Psychology*, *38*(2), 267–278.

Kumanyika, S. K. (2008). Environmental influences on childhood obesity: Ethnic and cultural influences in context. *Physiology & Behavior*, *94*(1), 61-70.

Latner, J. D., & Stunkard, A. J. (2003). Getting worse: The stigmatization of obese children. *Obesity Research*, *11*(3), 452-456.

Link, B. G., & Phelan, J. C. (2001). Conceptualizing stigma. *Annual Review of Sociology, (27)*, 363-385.

Loeber, R., Ttofi, M. M., Farrington, D. P., Lo, F., & David, P. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict, and Peace Research*, *3*(2), 63–73.

Lowry, W., Sallinen, B., & Janicke, D. (2007). The effects of weight management programs on self-esteem in pediatric overweight populations. *Journal of Pediatric Psychology, 32*(10), 1179-1195.

Lloyd-Richardson, E., Jelalian, E., Sato, A., Hart, C., Mehlenbeck, R., & Wing, R. (2012). Two-year follow-up of an adolescent behavior weight control intervention. *Pediatrics, 130*(2), e281-e288.

Lumeng, J. C., Forrest, P., Appugliese, D. P., Kaciroti, N., Corwyn, R. F., & Bradley, R. H. (2010). Weight status as a predictor of being bullied in third through sixth grades. *Pediatrics*, *125*(6), e1301–7.

Luppino, F. S., de Wit, L. M., Bouvy, P. F., Stijnen, T., Cuijpers, P., Pennix, B. W., and Zitman, F., G. (2010). Overweight, obesity, and depression: A systematic review and meta-analysis of longitudinal studies. *Archives of General Psychiatry. 67*(6), 220-229.

Mackey, E. R., & La Greca. (2007). Adolescents' eating, exercise, and weight control behaviors: Does peer crowd affiliation play a role? *Journal of Pediatric Psychology, 32*(1), 13-23.

Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly*, *18*(3), 231-252.

McElroy, S. L., Kotwal, R., Malhotra, S., Nelson, E. B., Keck, P. E., & Nemeroff, C. B. (2004). Are mood disorders and obesity related? A review for the mental health professional. *The Journal of Clinical Psychiatry*, *65*(5), 634–651.

Mei, Z., Grummer-Strawn, L. M., Pietrobelli, A., Goulding, A., Goran, M. I., & Dietz, W. H. (2002). Validity of body mass index compared with other body-composition screening indexes for the assessment of body fatness in children and adolescents. *The American Journal of Clinical Nutrition*, *75*(6), 978–85.

Merrell, K. W., Gueldner, B. A., Ross, S. W., & Isava, D. M. (2008). How effective are school bullying intervention programs? A meta-analysis of intervention research. *School Psychology Quarterly*, *23*(1), 26.

Muthén, L. K., & Muthén, B. O. BO 1998–2010. *Mplus User's Guide*, *6*.

Muthen, B., & Asparouhov, T. (2006). Item response mixture modeling: Application to tobacco dependence criteria. *Addictive Behaviors*, *31*(6), 1050–66.

Nader, P., Bradleym R., Houts, R., McRitchie, S., & O'Brien, M. (2008). Moderate-to-vigorous physical activity from ages 9 to 15 years. *Journal of the American Medical Association, 300*(3), 295–305.

Neumark-Sztainer, D, Falkner, N., Story, M., Perry, C., Hannan, P. J., & Mulert, S. (2002). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*, *26*(1), 123–31.

Neumark-Sztainer, Dianne, Croll, J., Story, M., Hannan, P. J., French, S. a, & Perry, C. (2002). Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: Findings from Project EAT. *Journal of Psychosomatic Research*, *53*(5), 963–74.

Neumark-Sztainer, D., Story, M., & Faibisch, L. (1998). Perceived stigmatization among overweight African-American and Caucasian adolescent girls. *Journal of Adolescent Health, 23*(5), 264-270.

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *The Journal of the American Medical Association, 311(8)*, 806-814.

Ogden, C. L., Lamb, M. M., Carroll, M. D., & Flegal, K. M. (2010). Obesity and socioeconomic status in children and adolescents: United States, 2005-2008. *NCHS Data Brief 2010, 51*, 1-8.

Olweus, D. (1994). Bullying at school: Basic facts and effects of a school based intervention program. *Journal of Child Psychology and Psychiatry*, *35*(7), 1171-1190.

Olweus, D. (2013). School bullying: Development and some important challenges. *Annual Review of Clinical Psychology*, *9*, 751–80.

Polanin, J. R., Espelage, D. L., Pigott, T. D. (2012). A meta-analysis of school-based bullying prevention programs' effects on bystander intervention behavior. *School Psychology Review, 41*(1), 47-65.

Puhl, R. M. & Brownell, K. D. (2003). Psychosocial origins of obesity stigma: Toward changing a powerful and pervasive bias. *Obesity Reviews, 4*(4), 213-227.

Puhl, R. M., & Heuer, C. A. (2011). Public opinion about laws to prohibit weight discrimination in the United States. *Obesity*, *19*(1), 74-82.

Puhl, R. M., & Latner, J. D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, *133*(4), 557–80.

Raskauskas, J., & Stoltz, A. D. (2007). Involvement in traditional and electronic bullying among adolescents. *Developmental Psychology*, *43*(3), 564.

Rancourt, D., Barker, D., Sato, A., Lloyd-Richardson, E., Hart, C., & Jelalian, E. (2014). Longitudinal associations among change in overweight status, fear of negative evaluation, and weight-related teasing among obese adolescents. *Journal of Pediatric Psychology, 39*(7), 697-707.

Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect*, *34*(4), 244–52.

Richardson, S. A., Goodman, N., Hastorf, A. H., & Dornbusch, S. M. (1961). Cultural uniformity in reaction to physical disabilities. *American Sociological Review*, 241-247.

Rigby, K. (2000). Effects of peer victimization in schools and perceived social support on adolescent well-being. *Journal of Adolescence, 23*(1), 57-68.

Rigby, K., & Johnson, B. (2006). Expressed readiness of Australian schoolchildren to act as bystanders in support of children who are being bullied. *Educational Psychology*, *26*(3), 425–440.

Roberts, R. E. & Duong, H. T. (2013). Obese youths are not more likely to become depressed, but depressed youths are more likely to become obese. *Psychological Medicine*, *43*(10), pp 2143-2151.

Roshanaei-Moghaddam, B., Katon, W. J., & Russo, J. (2009). The longitudinal effects of depression on physical activity. *General Hospital Psychiatry, 31*(4), 306-315.

Rueger, S. Y., Malecki, C. K., & Demaray, M. K. (2010). Relationship between multiple sources of perceived social support and psychological and academic adjustment in early adolescence: Comparisons across gender. *Journal of Youth and Adolescence*, *39*(1), 47-61.

Ryan, J. L., Ramsey, R. R., Fedele, D. A., Mullins, L. L., Chaney, J. M., & Jarvis, J. N. (2010). A longitudinal examination of the parent–child distress relationship in children with juvenile rheumatic disease. *Rehabilitation Psychology*, *55*(3), 286.

Satorra, A., & Muthen, B. (1995). Complex sample data in structural equation modeling. *Sociological Methodology*, *25*(1995), 267–316.

Savoye, M., Shaw, M., Dziura, J., Tamborlane W. V., Rose, P., Guandalini, C., Goldberg-Gell, R., Burgert, T. S., Cali, A.M., Weiss, R., & Caprio, S. (2007). Effects of a weight management program on body composition and metabolic parameters in overweight children: A randomized controlled trial. *Journal of the American Medical Association, 297*(24), 2697-2704.

Schwimmer, J. B., Burwinkle, T. M., & Varni J. W. (2003). Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association, 289(14)*, 1813-1819.

Singh, G. K., Kogan, M. D., Van Dyck, P. C., & Siahpush, M. (2008). Racial/ethnic, socioeconomic, and behavioral determinants of childhood and adolescent obesity in the United States: analyzing independent and joint associations. *Annals of Epidemiology*, *18*(9), 682-695.

Storch, E. a, Milsom, V. a, Debraganza, N., Lewin, A. B., Geffken, G. R., & Silverstein, J. H. (2007). Peer victimization, psychosocial adjustment, and physical activity in overweight and at-risk-for-overweight youth. *Journal of Pediatric Psychology*, *32*(1), 80–9.

Stunkard, A. J., & Wadden, T. A. (1992). Psychological aspects of severe obesity, *The American Journal of Clinical Nutrition*, *55*(2), 524S-532S.

Strauss, R. A., & Pollack, H. A. (2003). Social marginalization of overweight children. *Archives of Pediatrics & Adolescent Medicine, 157*(8), 746-752.

Swallen, K. C., Reither, E. N., Haas, S. A., & Meier, A. M. (2005). Overweight, obesity, and health-related quality of life among adolescents: The National Longitudinal Study of Adolescent Health. *Pediatrics*, *115*(2), 340-347.

Teychenne, M., Ball, K., & Salmon, J. (2008). Physical activity and likelihood of depression in adults: A review. *Preventive Medicine*, *46*(5), 397-411.

Thompson, R. J., Jr., Gil, K. M., Burbach, D. J., Keith, B. R., & Kinney, T. R. (1993a). Psychological adjustment of mothers of children and adolescents with sickle cell disease: The role of stress, coping methods, and family functioning. *Journal of Pediatric Psychology*, 18, 549-559

Thompson, R. J., Jr., Gil, K. M., Burbach, D. J., Keith, B. R., & Kinney, T. R. (1993b). Role of child and maternal processes in the psychological adjustment of children with sickle cell disease. *Journal of Consulting and Clinical Psychology*, 61, 468-474.

Thompson, R. J., Jr., Gustafson, K. E., Hamlett, K. W., & Spock A. (1992a). Psychological adjustment of children with cystic fibrosis: The role of child cognitive processes and maternal adjustment. *Journal of Pediatric Psychology*, 17, 741-755.

Thompson, R. J., Jr., Gustafson, K. E., Hamlett, K. W., & Spock A. (1992b). Stress, coping, and family functioning in the psychological adjustment of mothers of children with cystic fibrosis. *Journal of Pediatric Psychology*, 17, 573-585.

Troiano, R. P., Berrigan, D., Dodd, K. W., Mâsse, L. C., Tilert, T., & McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Medicine and Science in Sports and Exercise*, *40*(1), 181–8.

Ttofi, M. M., Farrington, D. P., Losel, F., & Loeber, R. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict, and Peace Research, 3*(2), 63-73.

Tussing-Humphreys, L. M., Fitzgibbon, M. L., Kong, A., & Odoms-Young, A. (2013). Weight loss maintenance in African American women: A systematic review of the behavioral lifestyle intervention literature. *Journal of Obesity*, *2013,*31.

Thompson, R. J., Gil, K. M., Gustafson, K. E., George, L. K., Keith, B. R., Spock, A., & Kinney, T. R. (1994). Stability and change in the psychological adjustment of mothers of children and adolescents with cystic fibrosis and sickle cell disease. *Journal of Pediatric Psychology*, *19*(2), 171-188.

Thompson, R. J., Jr., & Gustafson, K. E. (1996). *Adaptation to Chronic Childhood Illness.* Washington, DC: American Psychological Association Press.

Twemlow, S. W., Fonagy, P., & Sacco, F. C. (2006). The role of the bystander in the social architecture of bullying and violence in schools and communities. *Annals of the New York Academy of Sciences, 1036*, 215-232.

Volk, A. A., Dane, A. V., & Marini, Z. A. (2014). What is bullying? A theoretical redefinition. *Developmental Review, 34*(4), 327-343.

Whaley, A. L., Smith, M., & Hancock, A. (2011). Ethnic/racial differences in the self-reported physical and mental health correlates of adolescent obesity. *Journal of Health Psychology, 16*(7), 1048-1057.

Williams, J., Wake, M., Hesketh, K., Maher, E., & Waters, E. (2005). Health-related quality of life of overweight and obese children. *Journal of the American Medical Association*, *293*(1), 70-76.

Witherspoon, D., Latta, L., Wang, Y., & Black, M. (2013). Do depression, self-esteem, body-esteem, and eating attitudes vary by BMI among African American adolescents? *Journal of Pediatric Psychology, 38*(10), 1112-1120.

Ybarra, M. L., & Mitchell, K. J. (2004). Youth engaging in online harassment: Associations with caregiver–child relationships, internet use, and personal characteristics. *Journal of Adolescence*, *27*(3), 319-336.

APPENDIX A

FIGURES

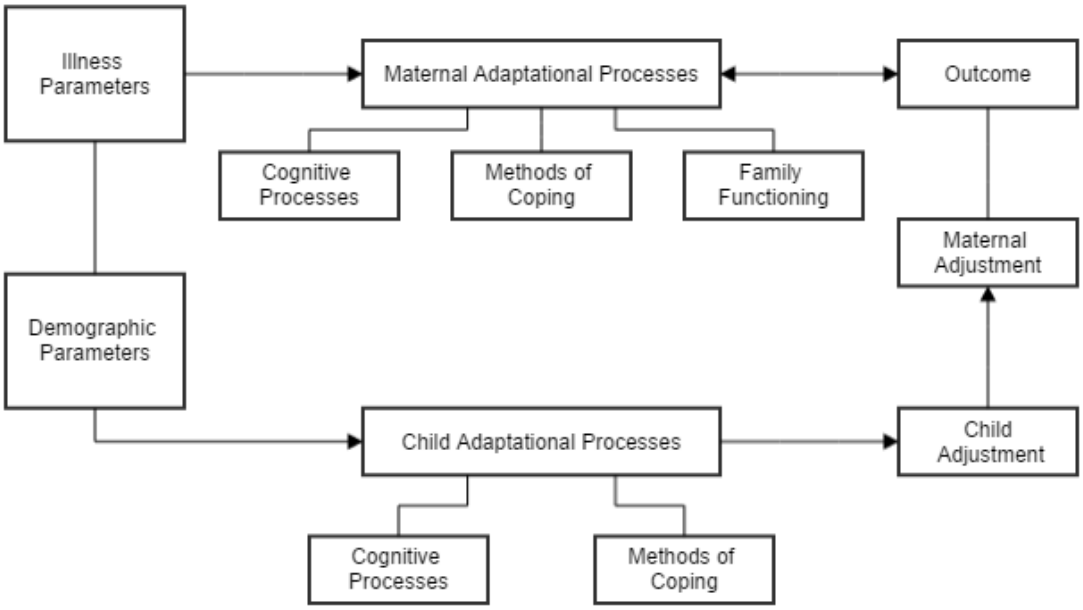

Figure 1. Transactional Stress and Coping Model (Thompson et al., 1993)

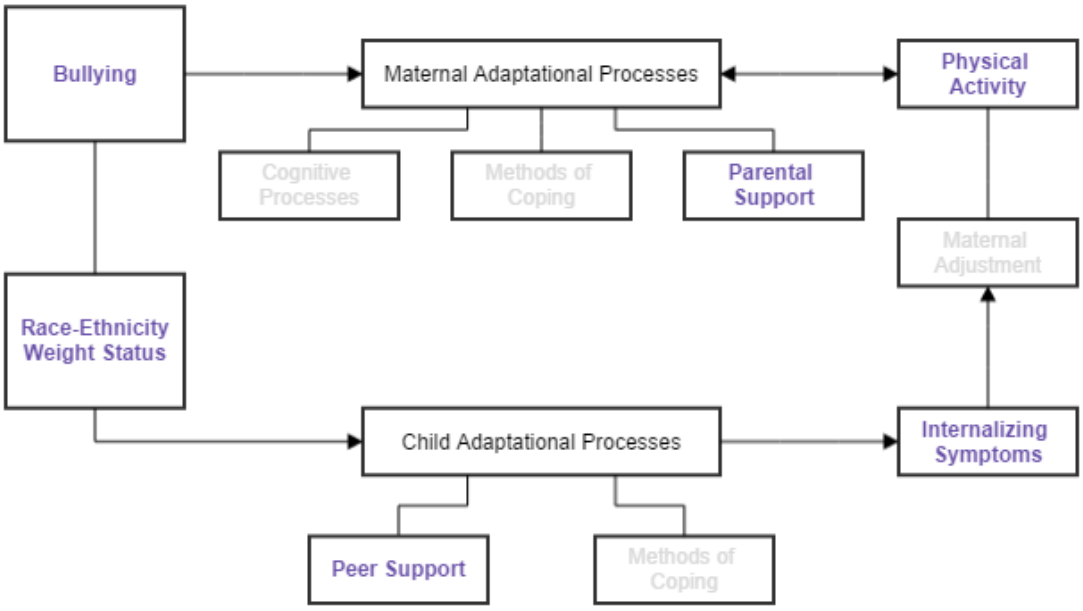

Figure 2. Adapted Transactional Stress and Coping Model

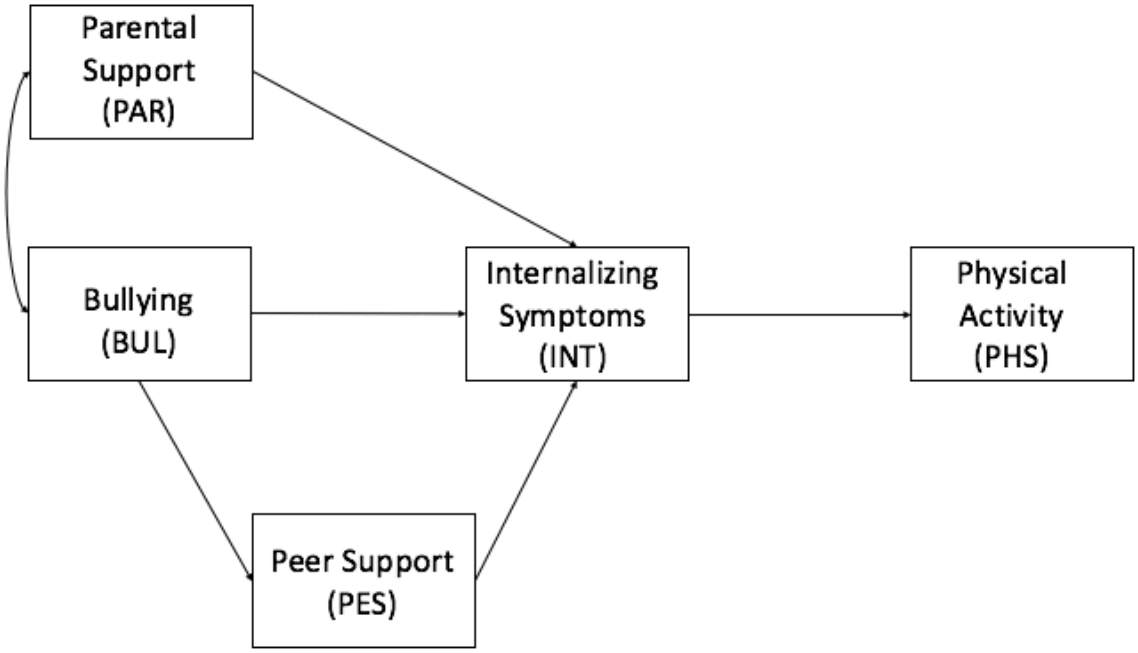

Figure 3. The Proposed Model Based on the Transactional Stress Coping model.
Note. BUL = Bullying, PAR = Parental support, PES = Peer Support, INT = Internalizing Symptoms, and PHS = Physical Activity.

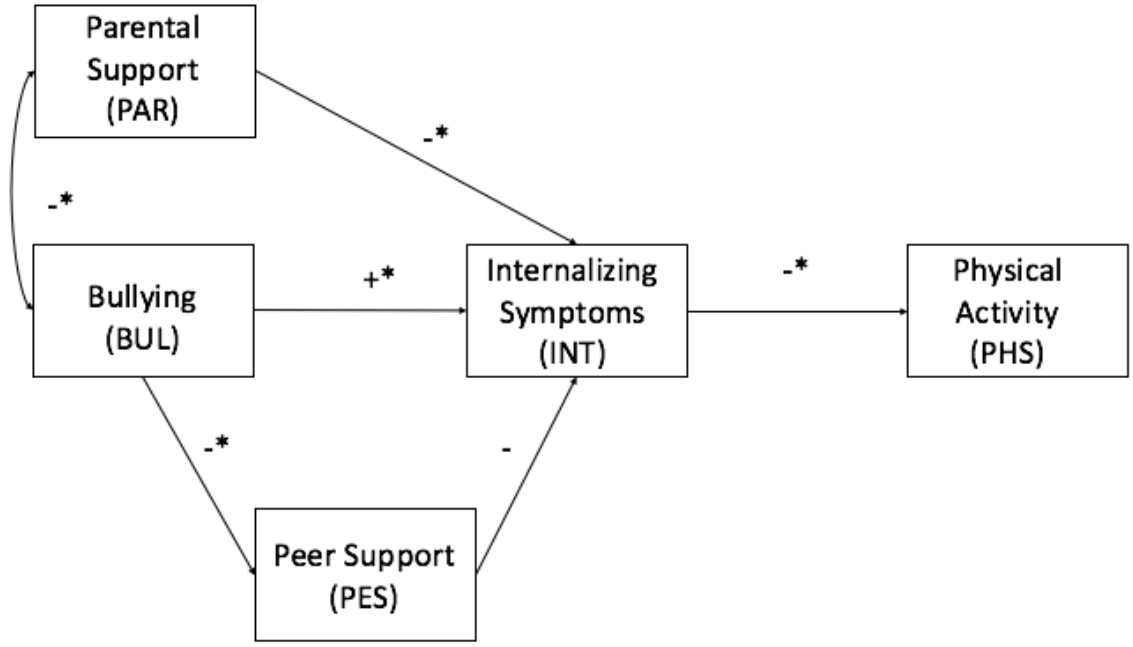

Figure 4. The Proposed Model with Hypothesized Directions for All Groups.
Note. * = Hypothesized direction confirmed by results. BUL = Bullying, PAR = Parental support, PES = Peer Support, INT = Internalizing Symptoms, and PHS = Physical Activity.

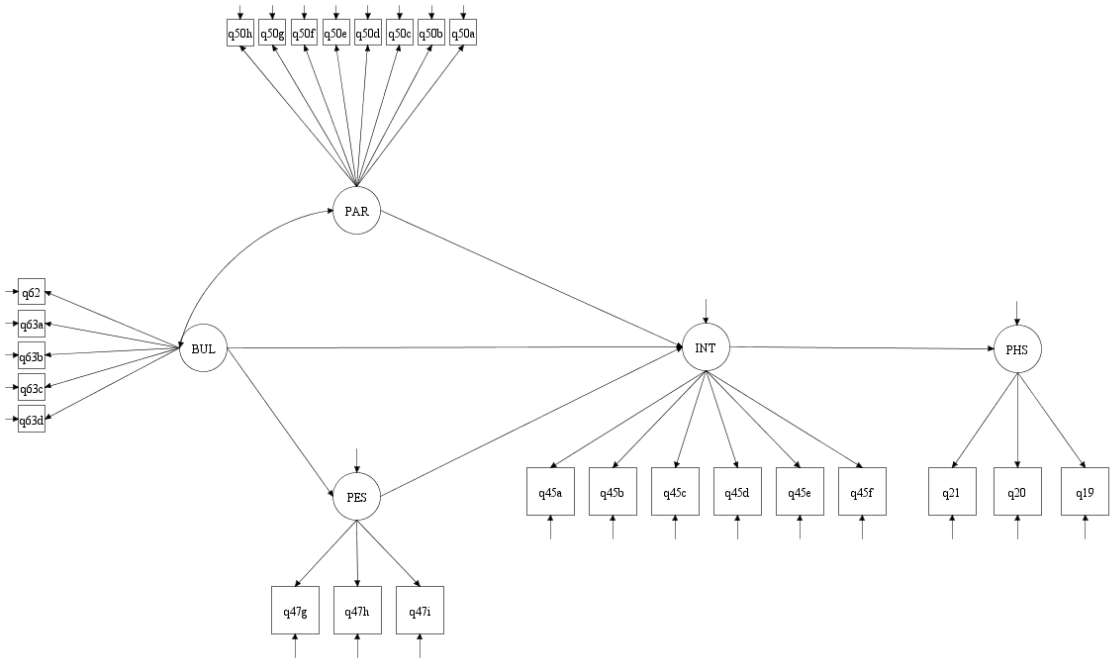

Figure 5. Full Structural Model
Note. * = Hypothesized direction confirmed by results. BUL = Bullying, PAR = Parental support, PES = Peer Support, INT = Internalizing Symptoms, and PHS = Physical Activity.

APPENDIX B

Tables

Table 1
Univariate Statistics

	WHW	WOW	AAHW	AAOW	OVERALL
Sample Size (%)	2368 (52.5%)	899 (19.9%)	750 (16.6%)	492 (10.9%)	4509
Gender (%)					
Male	45.4	55.6	48.5	46.3	48
Female	54.6	44.4	51.5	53.7	52
Grade (%)					
6th	12.1	13.7	11.6	14.0	12.6
7th	21.7	21.7	23.1	18.7	21.6
8th	22.0	23.9	23.6	27.2	23.2
9th	20.4	20.9	20.0	20.3	20.4
10th	23.8	19.8	21.7	19.7	22.2

Note. WHW = White healthy weight; WOW = White overweight;
BHW = Black healthy weight; BOW = Black overweight

Table 2
Baseline Models

Model	x^2 (*df*)	*p*-value	Relative x^2	RMSEA	CFI	SRMR
WHW	743.37 (253)	0.00	2.94*	0.03*	0.97*	0.03*
WOW	623.78 (261)	0.00	2.94*	0.04*	0.95*	0.04*
BHW	501.46 (264)	0.00	2.39*	0.04*	0.95*	0.04*
BOW	452.067 (259)	0.00	1.75*	0.04*	0.94*	0.06*

Note. * "Fair" or "Good" fit
WHW = White healthy weight; WOW = White overweight;
BHW = Black healthy weight; BOW = Black overweight

Table 3
Measurement Invariance: Fit

Model	x^2 (*df*)	*p*-value	RMSEA	CFI	SRMR
Configural (Baseline)	2557.135 (1038)	0.00	0.036*	0.955*	0.038*
Metric	2838.809 (1098)	0.00	0.038*	0.949*	0.045*
Scalar	3110.345 (1158)	0.00	0.039*	0.943*	0.046*

Note. * "Fair" or "Good" fit

Table 4
Measurement Invariance: Model Comparison

Models Compared	χ^2 (*df*)	*p*-value	Δ CFI
Configural vs. Metric	281.674 (60)	0.00	0.006*
Configural vs. Scalar	553.21 (120)	0.00	0.012
Metric vs. Scalar	271.536 (60)	0.00	0.006*

Note. *Invariance based on ≤.01 (Cheung and Rensvold, 2002)
** Invariance based on ≤.002 (Meade et al., 2008)

Table 5
Structural Model: Fit Indices

Model	χ^2 (*df*)	p-value	RMSEA	CFI	SRMR
Model 1	2917.885 (1114)	0.00	0.038	0.947	0.048

Table 6
Selected Unstandardized Parameter Estimates – White Healthy Weight

PATH	ESTIMATE	S.E.	Est./S.E.	Two-Tailed P-Value
PES ON BUL	-0.215	0.035	-6.213	0.000
INT ON				
PES	0.042	0.026	1.633	0.103
BUL	0.469	0.039	12.146	0.000
PAR	-0.896	0.050	-17.892	0.000
PHS ON INT	-0.385	0.048	-8.141	0.000
PAR WITH BUL	-0.058	0.006	-10.452	0.000

Note. PES = Peer support; BUL = Bully victimization; INT = Internalizing symptoms; PAR = Parental support; PHS = Physical activity; ON = regressed on; WITH = covary; S.E. = standard errors; Est./S.E. = Estimate divided by standard error

Table 7
Selected Unstandardized Parameter Estimates – White Over Weight

PATH	ESTIMATE	S.E.	Est./S.E.	Two-Tailed P-Value
PES ON BUL	-0.207	0.051	-4.061	0.000
INT ON				
PES	0.033	0.041	0.806	0.420
BUL	0.399	0.053	7.581	0.000
PAR	-0.965	0.086	-11.252	0.000
PHS ON INT	-0.347	0.062	-5.634	0.000
PAR WITH BUL	-0.070	0.011	-6.507	0.004

Note. PES = Peer support; BUL = Bully victimization; INT = Internalizing symptoms; PAR = Parental support; PHS = Physical activity; ON = regressed on; WITH = covary

Table 8
Selected Unstandardized Parameter Estimates – African American Healthy Weight

PATH	ESTIMATE	S.E.	Est./S.E.	Two-Tailed P-Value
PES ON BUL	-0.143	0.061	-2.34	0.019
INT ON				
PES	0.038	0.042	0.921	0.357
BUL	0.377	0.053	7.182	0.000
PAR	-0.633	0.079	-7.969	0.000
PHS ON INT	-0.445	0.094	-4.731	0.000
PAR WITH BUL	-0.034	0.012	-2.829	0.000

Note. PES = Peer support; BUL = Bully victimization; INT = Internalizing symptoms; PAR = Parental support; PHS = Physical activity; ON = regressed on; WITH = covary

Table 9
Selected Unstandardized Parameter Estimates – African American Overweight

PATH	ESTIMATE	S.E.	Est./S.E.	Two-Tailed P-Value
PES ON BUL	-0.414	0.080	-5.185	0.000
INT ON				
PES	0.093	0.054	1.708	0.088
BUL	0.298	0.076	3.941	0.000
PAR	-0.510	0.108	-4.707	0.000
PHS ON INT	-0.375	0.109	-3.427	0.001
PAR WITH BUL	-0.045	0.015	-3.072	0.000

Note. PES = Peer support; BUL = Bully victimization; INT = Internalizing symptoms; PAR = Parental support; PHS = Physical activity; ON = regressed on; WITH = covary

Table 10
Comparison of Unstandardized Parameter Estimates

Path Estimate		WHW	WOW	AAHW	AAOW
PES ON BUL		-0.215***	-0.207***	-0.143*	-0.414***
INT ON					
	PES	0.042	0.033	0.038	0.093
	BUL	0.469***	0.399***	0.377***	0.298***
	PAR	-0.896***	-0.965***	-0.633***	-0.510***
PHS ON INT		-0.385***	-0.347***	-0.445***	-0.375**
PAR WITH BUL		-0.058***	-0.070**	-0.034***	-0.045***

Note. *$p \leq .05$, **$p \leq .01$, ***$p \leq .001$
WHW = White healthy weight; WOW = White overweight
AAHW = African American healthy weight; AAOW = African American overweight

Table 11
Total, Direct, and Indirect Effects of BUL to INT

	WHW	WOW	AAHW	AAOW
Total	0.35***	0.30***	0.31***	0.21***
Direct (BUL > INT)	0.35***	0.30***	0.32***	0.24***
Indirect (BUL > PES > INT)	-0.01	-0.01	-0.01	-0.03

Note. * = p <.05; ** = p <.01; *** = p <.001

Table 12
Total Indirect and Specific Indirect Effects of BUL to PHS

	WHW	WOW	AAHW	AAOW
Total	-0.14***	-0.11***	-0.14***	-0.08*
Total Indirect	-0.14***	-0.11***	-0.14***	-0.08*
Indirect 1 (BUL > INT > PHS)	-0.15***	-0.11***	-0.14***	-0.09*
Indirect 2 (BUL > PES > INT > PHS)	0.003	0.002	0.002	0.01

Note. * = p <.05; ** = p <.01; *** = p <.001